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USSR Report

AGRICULTURE

(FOUO 7/81)



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AGRO-ECONOMICS AND ORGANIZATION

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YOUNG FOWL NEEDED FOR POULTRY RAISING ON PRIVATE PLOTS

Moscow PTITSEVODSTVO in Russian No 6, Jun 81 pp 5-8

[Article by V. Shpektorov, chief of Production Department at USSR Ptitseprom:
"Promoting the Development of Private Poultry Raising in Every Possible Way"]

[Text] Public poultry raising in our country is developing on an industrial basis and this is making it possible to increase rapidly the production of goods and to raise the efficiency of the branch. At the same time, an important source for augmenting the resources of poultry raising products is that of raising poultry on the private plots of kolkhoz members and manual and office employees. In 1980, according to preliminary data, these plots produced 21.7 billion eggs and 1 million tons of poultry meat, or 32 and 37.8 percent respectively of the overall production volumes for these products at all categories of farms. The products obtained from private plots serve as a substantial addition to the dining tables of their owners and represent a considerable portion of such products sold at the kolkhoz markets or procured by the state.

Recently, in connection with the great importance being attached to the further development of private poultry raising, the specialized enterprises and IPS's [incubator poultry-raising station] have been assigned annual tasks for selling young poultry stock to the population. Commencing in 1980, this indicator has been included in the national economic plan.

As a result of measures undertaken, the sale of young poultry stock to the population has increased (see Table).

During the Tenth Five-Year Plan, the average annual sales volume for young poultry stock sold to the population amounted to 492 million head, including 77 million head of waterfowl and turkeys, or 39 and 52 percent more respectively than during the Ninth Five-Year Plan. In all, 2.46 billion head of young poultry stock of all types were sold to the population during the 1976-1980 period, or 684 million more head than during the 1971-1975 period,

This task is being solved most successfully in the Ukrainian SSR. During the Tenth Five-Year Plan, the sale of young stock to the population increased by 40 percent, with 8.8 head being sold per rural resident during 1980. This was achieved mainly as a result of purposeful work carried out by the republic's interkolkhoz IPS's. Last year, they supplied 90 percent of the young stock made available to the private

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	Young Poultry Stock Sold To the Population (millions of head)				1980 in % of 1975	
	Total		Including Waterfowl and Turkeys (thousands of head)		Total	Including Waterfowl and Turkeys
	1975	1980	1975	1980		
Total for country	373.9	570.5	62.4	106.2	153	170
Including farms of USSR	245.9	384.5	38.0	63.9	156	168
Ptitseprom						
With IPS's numbering	170.6	174.7	21.8	29.8	102	137
Kolkhoz and interkolkhoz	122.1	175.8	22.0	39.4	144	179
IPS's						

Note. On the average for the country as a whole, 217,900 head of young stock were sold by one farm to the population, by a farm of USSR Ptitseprom -- 197,600 head, by a state IPS -- 325,300 head and by a kolkhoz (interkolkhoz) IPS -- 262,100 head.

plots. Thus the specialized farms of the republic's Ptitseprom are not devoting proper attention to this problem. After incubating considerably more eggs than the interkolkhoz IPS's, they sold almost ten times less young stock to the population.

During 1980, for the country as a whole, the IPS's accounted for 61.4 percent of the young stock sold to satisfy the requirements of the private plots. In all, they sold 350.5 million head to this group of farms. In the KiSSR the portion contributed by the IPS's was 80 percent and in the AzSSR and MSSR -- 70 percent.

In connection with the sale of young stock to the population, good indicators were achieved in the ArSSR -- 7.6 head, and in the MSSR -- 6.8 head on the average for each rural resident. This indicator also increased noticeably in the Russian Federation -- by 1.6 times and it reached an average of 6.7 head. However, it fluctuates sharply for individual krais and oblasts.

As yet, very few young stock are being sold to the populations in the LaSSR and ESSR -- 2.7 head in each, or in the BSSR -- 2.1 head. The situation is especially bad in the TuSSR, TaSSR and UzSSR, where during 1980 only 1.1, 0.9 and 0.7 head of young stock respectively were sold per individual rural resident. Deserving of mention is the fact that in the MSSR, where 6.8 head were sold to the population and in the GSSR -- 5.1 head, this indicator remains practically at the same level as that for 1975. And indeed it is in these republics, just as in other southern regions of the country, that the most favorable natural-climatic conditions are found for the development of poultry raising on private plots.

Recently, an increase has taken place in the sale of young waterfowl and turkeys to the population. However, for the country as a whole, the proportion of such sales compared to the overall volume of poultry sales during 1980 amounted to only 18.6 percent. Very few ducklings, goslings and young turkeys are being sold to the population in the AzSSR, ArSSR and UzSSR and in the MSSR two times less poultry of these types were sold last year compared to the previous year.

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We are still encountering incidents of the purchasers having to stand on line at the gates of the poultry factories or IPS's in order to procure young stock. In some areas it has even become a problem to purchase day-old chicks of egg-laying strains. In the case of meat strains of chicks, ducklings, goslings and young turkeys, almost nowhere are the requirements of the population for them being satisfied.

I would like to emphasize that the periods for selling these types of poultry to the population can be expanded considerably. The high level of rapid growth in young meat stock, especially broiler type chicks and ducklings, which achieve slaughtering weight and good marketable qualities in just 2 months, makes it possible to accept them for raising on private plots prior to the commencement of autumn and even in October in the southern regions of the country. Moreover, during the second half of the year, considerably more favorable conditions exist for supplying the young stock with feed, mainly various types of succulent and green feed obtained on the private plots.

In this regard, it makes no sense to dissolve prematurely the parental flocks of meat poultry, as so often happens on reproduction farms and breeding farms. All measures must be undertaken aimed at organizing the removal and sale to the population of young beef stock throughout all of the summer months.

During the next 2-3 years, the number of parental flocks on farms in the public sector must be increased by a minimum of 1.5-2 times and strict control must be established over the use of pedigree products.

The technological schedules for completing the parental flocks must be composed in a manner such that not only are the internal requirements for hybrid poultry satisfied, but it also becomes possible to sell a maximum number of young stock to the population during the spring and summer months. If conditions permit, thought should be given to organizing parental flocks, especially for meat types of poultry, at the large IPS's.

Serious attention should be given to increasing the number of geese; use can be made of succulent and green feed and natural grazing land for raising the young stock of this poultry.

The experience accumulated in the procurement of incubative eggs of waterfowl and young turkeys in the private sector, as practiced by interkolkhoz IPS's in Poltavskaya Oblast, where in 1980 approximately 2 million eggs were procured using this method, is deserving of maximum dissemination. It is understood that the populated points and farms where the incubative eggs are procured must be satisfactory from the standpoint of poultry diseases and that the animals should be subjected to veterinary control. The eggs received from private plots must necessarily be disinfected. They should ideally be incubated in an incubator specially provided for this purpose.

A considerable reserve for increasing the breeding of young stock for private plots could be the use for this purpose of the various types and strains of poultry being maintained on the collection farms of scientific-research institutes (Yerevan, Moscow and Poltava glinistiy hens, Rhode Island reds, New Hampshires, Sussexes and Adler silver types, strains and strain groups of ducks, geese and turkeys). The same

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holds true for reserve and pedigree lines of Plymouth Rocks and Cornish hens. In addition to the additional source of incubative eggs, the sale of young stock of rare strains, strain groups and lines will make it possible to increase their number, a factor which is of considerable importance.

Radical measures must be undertaken to improve the use of the parental flocks of meat poultry. The experience of many farms has shown that a parental flock that is satisfactory from a veterinary standpoint can be used for the incubation of all biologically full-value eggs, regardless of their weight.

During the past few years, the incubator pool for poultry raising farms and IPS's has been expanded considerably and modernized. On 1 January of this year, it had a capability for handling 625.1 million eggs at all of the public farms, that is, during the Tenth Five-Year Plan this capability had increased by 178.9 million eggs. On the overwhelming majority of farms and IPS's, this pool consists of modern Universal-50, Universal-55 and IKP-90 incubators.

It would seem that all of the conditions are available for a sharp increase in the sale of young stock to the population. However, by no means is full use being made of this potential. It is known that the greatest demand for young poultry stock for the private plots lasts for 3-4 months during the spring and summer: from March until June. It is precisely during this period that maximum use should be made of the incubator pool. During the 4 months mentioned, this pool can be used for more than four times. Last year however, it was used only 2.1 times during these months in the TuSSR and GSSR. Thus the pool available here, even during the period considered tense from the standpoint of incubation, was actually empty for one half of the time. In the BSSR, this indicator was 2.2 for the same period, in the KaSSR -- 2.4, in the MSSR -- 2.6 and in the AzSSR -- 2.8. Hence it follows that an improvement in the use of the capabilities of the incubators represents a great reserve for increasing the breeding of young stock and improving the technical-economic indicators for the incubation of eggs.

For the future, in order to achieve high rates of growth in the sale of young stock to the population, it will be necessary to first of all increase such sales during the spring and summer months. Hence, even on those farms where the incubator pool is operated at maximum capability during this period and during the remaining period of the year it does not have a full workload, its capabilities should nonetheless be expanded. The principal concern is achieving a maximum increase in the breeding of young stock for sale to the population. The seasonal nature of such sales is a constantly active factor and one which must be confronted.

Special attention must be given to raising the hatching percentage for the young stock. In recent years, this indicator has worsened on a majority of the farms and IPS's and the trend towards a further reduction continues at the present time. In 1979, for all farms of USSR Ptitseprom, the average hatching percentage for chicks of egg-laying strains was 71.1 percent and meat strains -- 68.9 percent; the hatching percentage was even lower for young waterfowl stock and young turkeys. This situation was caused mainly by the fact that the incubator workers attached more importance to increasing the number of incubated eggs than they did to the hatching of young stock. In some areas, a reduction in the hatching percentage tends to underscore serious shortcomings in the zootechnical work. Greater use must

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be made of the experience of leading farms and the IPS's, which are achieving high indicators on a regular basis. Thus, at the Poltava IPS in the oblast of the same name, the hatching of egg-laying strains of chicks in 1980 amounted to 84.9 percent, ducklings at the Tarashcha IPS in Kiyevskaya Oblast -- 79 percent and goslings at the Nizhnegorsk IPS in Krymskaya Oblast -- 88.4 percent.

The organization of young stock sales for satisfying the requirements of the private plots is in need of considerably improvement. The leaders and specialists at the poultry raising farms and IPS's, in close collaboration with the settlement and rural soviets of peoples' deputies, must study thoroughly the populations requirements for the various types of young poultry stock, they must gather up the requests in a timely manner and undertake measures to ensure that they are satisfied completely. The population must be informed in advance concerning the schedules and places where the young stock are to be sold and permanent sales points must be designated. The trade in young stock must be carried out more extensively directly in the populated points and on the production tracts of kolkhozes and sovkhoses.

The practice of concluding contracts between the IPS's and incubator houses of poultry raising enterprises with kolkhozes and other farms, for the delivery of young stock to kolkhoz members and manual and office workers residing on the territories of these farms, must be given maximum support and dissemination. The pet stores in cities and worker settlements should be supplied with greater quantities of young poultry stock. The systematic publication in the local press of zooveterinary advice by specialists in the raising of young stock and the maintenance of adult poultry should be organized and use should also be made of the radio network for this purpose. During lectures and consultations, attention should be directed towards the need for utilizing easily accessible and cheap local feeds -- green, succulent, vitamin, mineral and food remnants.

The January 1981 decree of the CC CPSU and the USSR Council of Ministers entitled "Additional Measures for Increasing the Production of Agricultural Products on the Private Plots of Citizens" is opening up new and broad opportunities for developing private poultry raising. In conformity with this decree, sovkhoses and other agricultural enterprises are authorized and a recommendation has been made to allow kolkhozes to conclude contracts on a strictly voluntary basis with kolkhoz members and manual and office workers residing on their territories and conscientiously participating in public production, and also with pensioners, for the raising and procurement of livestock and poultry.

The kolkhozes, sovkhoses and other agricultural enterprises are being tasked with furnishing assistance to kolkhoz members and manual and office workers in the form of young livestock and poultry, feed, grazing and haying lands and other services. The system for selling the products produced must also be pointed out in the contract.

The decree calls for other measures aimed at increasing the production of agricultural products to the maximum possible degree, including poultry raising products and on the private plots of kolkhoz members and manual and office workers.

The task at hand consists of carrying out the required organizational and explanatory work and acquainting the population on an extensive scale with the measures called for in the mentioned decree.

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On poultry raising farms in a number of republics and oblasts throughout the country, some experience has already been accumulated in organizing the raising of poultry for meat purposes based upon contracts concluded with the population. In 1980, the population in Odesskaya Oblast raised and turned over to the state 130,000 head of young poultry stock, the overall weight of which was 250 tons. This year the plans call for 500 tons to be obtained. The raising of poultry by the population in the GSSR and in a number of oblasts and krays in the RSFSR is being organized.

A plan for selling 586 million head of young poultry stock to the population has been established for 1981. In the majority of instances, this work is better organized than it has been in previous years. During the first quarter of this year, 32 percent more young stock were sold than during the same period in 1980. The interkolkhoz IPS's in the Ukraine and also the state IPS's in the Russian Federation have achieved noticeable increases.

It should be borne in mind that the 1981 plan for selling young poultry stock to the population is minimal in nature. The poultry raising farms, IPS's and other agricultural enterprises must ensure, as pointed out in the decree of the CC CPSU and the USSR Council of Ministers entitled "Additional Measures for Increasing the Production of Agricultural Products on the Private Plots of Citizens," the sale of young poultry stock to the population in quantities which will satisfy the private plot requirements for them and taking into account the raising of poultry in accordance with contracts with kolkhozes, sovkhoses and other agricultural enterprises and with the organizations of consumer cooperation.

All possible measures must be undertaken to achieve the rapid development of private poultry raising and to utilize this important reserve for increasing the production of the branch's products.

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AGRICULTURAL EQUIPMENT NORMS DEVELOPED

Moscow PLANIROVANIYE I UCHET V SEL'SKOKHOZYAYSTVENNYKH PREDPRIATIYAKH in Russian
No 7, July 81 pp 8-11

[Article by M.V. Shakhmayaev, chief of the laboratory for the development of norms for planning the development of the mechanization of cropping of the All-Union Scientific Research Institute of Agricultural Mechanization, candidate in economic sciences: "Planning the Needs for Agricultural Equipment by Norms"]

[Text] The 26th CPSU Congress defined as a chief task a further improvement of public well-being on the basis of an acceleration of scientific and technological progress and a rise in labor productivity and an increase in its efficiency. Its successful accomplishment depends to the large extent upon the development rates of agricultural production.

Great importance is being attributed in this connection to a strengthening of the material and technical base of agriculture. A scientific substantiation of norms for farm equipment needs is an important lever which regulates the planned process of the creation on the kolkhozes, sovkhozes, and other state agricultural enterprises of a machinery pool which makes it possible to perform work in all of the country's soil and climate zones in optimal agrotechnical periods and with the least expenditures of labor and material and monetary resources.

The sequence of the development of such norms includes the following stages:

--a discovery of the long-term production directions of agricultural enterprises and the classification by type of all of the farms of every area by specialization groups. The long-term specialization of the farms was calculated in accordance with the "Plans for the Organizational-Managerial Structure of Kolkhozes and Sovkhozes for 1980-1990";

--the singling out of typical farms (object-representatives) which reflect the most important characteristics of their specializations;

--a calculation of optimal equipment needs for typical farms. In the formation of the machinery and tractor pool account is taken of efficient forms of the use of machines and of promising technologies. A comparative evaluation of the different methods of mechanizing operations in keeping with the criterion of adduced expenditures makes it possible to arrive at the selection of equipment from a nation-

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al economic point of view and to ensure, in this way, uniformity in determining the most effective sets of machines with respect to the concrete conditions of the farms;

--the development of the equipment need norms of a typical farm for the mechanization of cropping. The relative indicators which express the number of machines per 1000 hectares of arable land or sowings (plantings) of agricultural crops (perennial plantings) are taken as these norms;

--a weighted average calculation of the norms by levels of planning (typical farm, oblast, economic region, republic, and the country as a whole).

In order to give consideration to the conditions for the production of agricultural output in all of the mechanization zones the calculations of the equipment need norms were performed on the basis of typical farms which reflect the special characteristics of growing and harvesting crops in the economic regions and union republics. The basis for the development of the norms consisted of 172 object-representative farms. The norms are determined on the basis of the optimal size of a machine and tractor pool calculated with the help of the mathematical economic method on computers:

$$\sum_k \sum_j \sum_i H_{ij} T_{ijk} Y_{ijk} + \sum_i X_i M_i \rightarrow \text{minimum}$$

with the limitations:

$$b_{ji} T_{ijk} Y_{ijk} = \theta_{jk};$$

$$\sum_i r_{ii} Y_{ijk} = X_i;$$

$$X_i \geq 0; Y_{ijk} \geq 0,$$

where k--is the numbers of the calculated calendar periods;

j--is the numbers of the types of operations performed on the farms;

t--is the numbers of the types of units which can be used to perform the operations on the farms;

i--is the numbers of the brands of machines;

M_{ij} --are the adduced expenditures per one hour of use of i -unit at j -operation (excluding allotments for the full restoration of the machines, expenditures for storage, and the capital investment effectiveness norm), rubles;

T_{ijk} --is the work load in hours of i -unit at j -operation in k -;

Y_{ijk} --is the needed number of units of i -type employed in k - at j -operations;

x_i --is the needed machinery pool of i -brand;

M_i --are the annual allotments for renovation, the expenditures for storage of the machines, and the capital investment effectiveness norm;

b_{ji} --is the output norm of i -unit in an hour of shift time;

θ_{jk} --is the amount of work to be performed in k -;

r_{ii} --is the number of machines of i -brand which make up i -unit.

The norms of the needs of kolkhozes and sovkhoses for tractors, trailers, combines, and other agricultural machinery for cropping and intrafarm operations have been worked out with regard to the experience obtained during the past five-year plan. (Table 1)

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1 Нормативы потребности колхозов и совхозов СССР в тракторах и сельскохозяйственных машинах на десятую и одиннадцатую пятилетки

2 Наименование групп тракторов и сельскохозяйственных машин	3 Нормативы потребности на 1000 га. шт.		4 1981 1985 год в % к 1976 1980 годам
	1976—1980 годы	1981—1985 годы	
5 Тракторы:			
6 в эталонном исчислении	14,16	15,41	108,8
7 в физическом исчислении	13,51	14,65	108,4
8 Тракторные прицепы	10,09	15,21	150,7
9 Плуги общего назначения	6,54	6,79	103,8
10 Машины для борьбы с эрозией почв	0,55	1,34	243,6
11 Луничилки дисковые	1,09	1,44	132,1
12 Культиваторы для сплошной обработки почвы	4,66	4,50	96,6
13 Катки	2,67	3,25	121,7
14 Бороны дисковые	1,32	1,28	97,0
15 Разбрасыватели удобрений:			
а минеральных	2,12	2,56	120,8
б жидких органических	0,67	0,74	110,4
16 Опрыскиватели	1,39	2,67	232,4
17 Протравливатели семян	0,43	0,48	111,6
18 Сеялки зерновые и зернокомбинированные	10,72	11,40	106,3
19 Комбайны зерноуборочные	8,23	7,94	96,5
20 Сеялки кукурузные	13,48	10,7	79,4
21 Культиваторы-растениепитатели	14,41	10,7	71,2
22 Комбайны кукурузоуборочные	16,08	13,33	82,9
23 Косилки	9,21	11,12	120,7
24 Грабли	6,24	7,50	120,2
25 Полокунки	3,05	3,00	98,1
26 Пресс-подборщики	2,67	4,50	168,5
27 Кормоуборочные комбайны	17,28	16,54	95,7
28 Сеялки для хлопчатника	18,6	23,79	127,9
29 Культиваторы	20,1	23,80	118,4
30 Хлопкоуборочные машины	20,5	46,05	224,6
31 Сеялки свекловичные	16,94	20,17	118,9
32 Культиваторы свекловичные	17,53	23,36	133,3
33 Комбайны и комплексы свеклоуборочные	27,25	14,96	54,9
34 Картофелесяжалки	29,41	29,06	98,8
35 Культиваторы-окушники	29,41	28,21	95,9
36 Картофелекопатели	25,84	23,17	89,7
37 Комбайны картофелеуборочные	22,69	28,21	124,3
38 Сеялки овощные	32,74	39,03	119,2
39 Канустоуборочные машины	43,30	29,06	67,1
40 Рассадопосадочные машины	47,4	53,78	113,5

39 Примечание: тракторы, тракторные прицепы, плуги общего назначения, машины для борьбы с эрозией почв, луничилки, культиваторы для сплошной обработки почвы, катки, бороны, разбрасыватели удобрений, опрыскиватели и протравливатели относятся на площадь пашни; сеялки зерновые и зернокомбинированные, комбайны зерноуборочные — на площадь посева зерновых культур; сеялки кукурузные, культиваторы-растениепитатели, комбайны кукурузоуборочные — на площадь посева и уборки кукурузы; косилки, грабли, полкунки, пресс-подборщики — на площадь однолетних, многолетних трав на сено и естественных сенокосов, убираемых механизированным способом; кормоуборочные и силосоуборочные комбайны — на площадь силосных культур; сеялки для хлопчатника, культиваторы хлопкоуборочные и хлопкоуборочные машины — на площадь хлопчатников; сеялки свекловичные, культиваторы-прореживатели, комбайны свеклоуборочные — на площадь посева сахарной свеклы (фабричной); картофелесяжалки, культиваторы-окушники, картофелекопатели, комбайны картофелеуборочные — на площадь посадки картофеля.

Key:

- | | |
|---|--|
| 1. Norms of the needs of USSR kolkhozes and sovkhoses for tractors and agricultural machinery for the 10th and 11th five-year plans | a. in standard computation
b. in physical computation |
| 2. Name of the groups of tractors and agricultural machines | 6. Tractor trailers |
| 3. Need norms per 1000 hectares, units | 7. General purpose plows |
| 4. 1981-1985 in percentage of 1976-1980 | 8. Anti-soil-erosion machines |
| 5. Tractors | 9. Disc harrows |
| | 10. Cultivators for continuous soil cultivation |
| | 11. Rollers |
| | 12. disc cultivators |
| | 13. fertilizer scatterers |

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|-------------------------------------|--|
| a. mineral | 28. cotton harvesting machines |
| b. liquid organic | 29. sugar beet sowers |
| 14. sprayers | 30. sugar beet cultivators |
| 15. seed disinfectors | 31. sugar beet harvesting combines and complexes |
| 16. grain and combined grain sowers | 32. potato planters |
| 17. grain harvesting combines | 33. cultivator-hillers |
| 18. corn sowers | 34. potato diggers |
| 19. cultivator-plant feeders | 35. potato harvesting combines |
| 20. corn harvesting combines | 36. vegetable sowers |
| 21. mowers | 37. cabbage harvesting machines |
| 22. rakes | 38. seedling planters |
| 23. buck rakes | 39. Notes tractors, tractor trailers, general purpose plows, anti-soil erosion machines, harrows, continuous soil cultivators, rollers, cultivators, fertilizer scatterers, sprayers, and disinfectors are referred to an area of arable land; grain and combined grain sowers and grain harvesting combines--to an area of grain crops; corn sowers, cultivator-feeders, and corn harvesting combines--to an area of sown and harvested corn; mowers, rakes, buck rakes, and balers--to an area of annual and perennial hay grasses and of natural hay harvested by machinery; fodder and silage harvesting combines--to an area of silage crops; cotton sowers and cotton cultivators and harvesters--to an area of cotton plants; sugar beet sowers, cultivator-thinners, and sugar beet harvesting combines--to an area of sugar beets(factory); potato planters, cultivator-hillers, potato diggers, and potato harvesting combines--to an area of potato plantings. |
| 24. balers | |
| 25. fodder harvesting combines | |
| 26. cotton sowers | |
| 27. cultivators | |

The relative data presented in Table 1 testifies to the stable character of a number of equipment need norms (tractors, general purpose plows, continuous soil cultivators, disc cultivators, grain harvesting combines, buck rakes, fodder harvesting combines, potato planters, and cultivator-hillers). During the years 1976-1980 and for the 11th Five-Year Plan a system of norms developed which permitted their use by planning and directive agencies for the formation of machinery and tractor pools for kolkhozes and sovkhoses which were in accord with the concrete conditions of the farms during the planning period. At the same time, one's attention is struck by the important changes in the needs for anti-soil-erosion machines, sprayers, and cotton harvesting machines which increased by 2.4, 2.3, and 2.2 times, respectively. This is explained by the necessity for shifting to industrial tech-

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nologies.

The creation and introduction of a complex of highly productive machines leads to a decrease in the need norms. Thus, with the mass employment of the RKS-6 and BM-6a sugar beet harvesting complex, and of the RKS-4 and BM-4 for irrigated sugar beet zones, the need norms decreased by 45 percent, which is indicated by the data in Table 1. And the use of such modern combines as the KSK-100 fodder harvesting combine and the two-row combines for continuous cabbage harvesting, as well as the KSKU-6 corn harvesting combine, leads to a decrease in the norms of 4.3, 33, and 17 percent, respectively.

The kolkhoz and sovkhos equipment need norms make it possible to provide the country's republics and economic regions with a set of agricultural machines and tractors of various traction classes, although, it is true, the latter show important regional differences (Table 2). Thus, with an average union level of 14.65 units, the smallest number of these machines and tractors in physical terms per 1000 hectares of arable land occurs in the West Siberian economic region--7.97 units, the East Siberian economic region--8.13 units, and the economic regions of the Kazakh SSR--8.19 units, while the largest number occurs in the Turkmen SSR--44.6 units and the Tajik SSR--43.3 units where the proportion of arable land in the structure of agricultural land is negligible; in the Uzbek SSR with its developed cotton farming the number is 44.74 units, and in the Georgian SSR where perennial plants occupy a leading place in agriculture the number is 39.60 units.

Таблица 2

/ Нормативы потребности колхозов и совхозов в тракторах, тракторных прицепах и почвообрабатывающих машинах для растениеводства (в шт. на 1000 га пашни)

2	Союзные республики и экономические районы	3 Тракторы и самоходные шасси		6 Трактор- ные прицепы	7 Почвообрабатывающие машины						
		4 в стандартном исчислении	5 в физическом исчислении		8 плуги общего назначе- ния	9 лущиль- ники дисковые	10 культивато- ры для сплошной обработки	11 катки	12 бороны дисковые		
	СССР 13	15,11	14,65	15,21	6,79	1,44	4,5	3,25	1,28		
	РСФСР 14	14,59	13,42	14,34	6,29	1,50	4,27	3,48	1,36		
	Северо-Западный 15	24,30	26,18	9,54	8,67	1,4	6,61	3,7	2,4		
	Центральный 16	23,21	25,51	14,59	6,63	1,4	6,01	3,5	2,0		
	Полго-Витский 17	15,69	17,16	15,01	5,93	1,4	6,30	3,6	1,6		
	Центрально-Черноземный 18	14,30	13,58	16,72	5,90	1,6	5,50	7,3	1,7		
	Новолжский 19	14,18	10,98	20,08	5,90	1,7	2,5	3,1	1,3		
	Северо-Кавказский 20	15,11	13,12	11,34	6,84	1,3	4,6	2,2	0,6		
	Уральский 21	15,12	12,50	13,49	8,00	1,3	3,5	3,6	1,9		
	Западно-Сибирский 22	10,15	7,97	11,18	5,31	1,7	4,3	2,8	1,0		
	Восточно-Сибирский 23	10,28	8,13	9,9	5,02	1,5	3,8	3,2	1,0		
	Дальневосточный 24	14,74	13,34	8,54	4,93	1,2	4,61	4,5	0,8		
	Украинская ССР 25	16,06	16,35	19,26	6,74	1,9	6,4	3,2	1,5		
	Белорусская ССР 26	21,80	23,6	15,1	10,24	1,0	7,1	4,9	2,4		
	Узбекская ССР 27	38,85	44,74	31,4	15,20	0,2	0,8	1,6	3,4		
	Казахская ССР 28	11,91	8,19	9,7	5,83	1,0	3,1	2,3	0,2		
	Грузинская ССР 29	29,17	39,60	14,0	9,03	1,8	7,6	5,9	1,5		
	Азербайджанская ССР 30	26,09	26,75	16,06	11,96	1,6	5,8	1,8	3,9		
	Литовская ССР 31	23,10	25,03	13,9	11,88	1,6	7,4	3,5	1,9		
	Молдавская ССР 32	25,02	24,62	15,0	8,77	1,8	10,4	2,9	0,5		
	Латвийская ССР 33	21,05	24,25	17,66	12,03	1,2	4,6	7,3	1,3		
	Киргизская ССР 34	21,00	43,30	23,5	5,61	0,8	2,4	3,5	2,7		
	Таджикская ССР 35	22,13	25,00	18,5	8,88	2,5	6,8	5,6	1,7		
	Армянская ССР 36	22,19	44,60	36,1	15,97	0,8	2,7	3,5	2,7		
	Туркменская ССР 37	39,05	24,72	11,6	9,90	1,6	7,3	3,6	2,4		
	Эстонская ССР 38	21,12									

Key-

1. Kolkhoz and sovkhos need norms for tractors, tractor trailers,

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- | | |
|---|---------------------|
| and soil cultivating machines for | 21. Urals |
| cropping (in units per 1000 hectares | 22. West Siberian |
| of arable land) | 23. East Siberian |
| 2. Union republics and economic regions | 24. Far East |
| 3. Tractors and self-propelled chassis | 25. Ukrainian SSR |
| 4. In standard computation | 26. Belorussian SSR |
| 5. In physical computation | 27. Uzbek SSR |
| 6. Tractor trailers | 28. Kazakh SSR |
| 7. Soil cultivating machines | 29. Georgian SSR |
| 8. General purpose plows | 30. Azerbaijan SSR |
| 9. Disc harrows | 31. Lithuanian SSR |
| 10. Continuous cultivators | 32. Moldavian SSR |
| 11. Rollers | 33. Latvian SSR |
| 12. Disc cultivators | 34. Kirghiz SSR |
| 13. USSR | 35. Tajik SSR |
| 14. RSFSR | 36. Armenian SSR |
| 15. Northwest | 37. Turkmen SSR |
| 16. Central | 38. Estonian SSR |
| 17. Volga-Vyatskiy | |
| 18. Central black earth | |
| 19. Volga | |
| 20. North Caucasian | |

There is also a substantial fluctuation by regions in the need for machines for sowing and harvesting grain crops, for applying fertilizers, and for chemical plant protection. A further development of the overall mechanization of the growing and harvesting of agricultural crops and a shift to industrial technologies is a very important condition for the equalization of these norms.

Using the norms, it is possible to define a scientifically substantiated need for machines for growing and harvesting agricultural crops in accordance with the following formula:

$$X = \frac{H \cdot \Pi}{1000} = 0,001 \text{ H}\Pi,$$

Where x--is the need for tractors and agricultural machines at the end of the planning period, units;

H--are the kolkhoz and sovkhoz need norms for tractors and agricultural machines for 1000 hectares of arable land or of agricultural crops, units;

Π --is the arable or agricultural crop area, hectares.

On the basis of the overall needs, the annual deliveries of machines for the five-year plan are established:

$$M = 0,2 \cdot 10^{-3} \text{ H}\Pi - 0,2\Phi + C,$$

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Where M --are the deliveries of machines during the year in accordance with the scientifically substantiated need norms for them, units;

Φ --is the existing machinery pool at the beginning of the five-year plan, units;

C --is the number of machines which are written off annually, units

With a need norm for grain and combined grain sowers of 11.4 units per 1000 hectares and with a planned area of 132,526,000 hectares, the need will be:

$$X = \frac{11.4 \cdot 132\,526\,000}{1000} = 1\,510\,796 \text{ шт.}$$

With the number of sowers on 1 January 1981 amounting to 1,070,000 units and an annual write-off of 105,000 units, their delivery will be:

$$M = 0.2 \cdot 10^{-3} \cdot 11.4 \cdot 132\,526\,000 - 0.2 \cdot 1\,070\,000 + 105\,000 = 193\,159 \text{ шт.}$$

A shift from union-republic norms to norms for an oblast or farm is achieved with the help of the following formula:

$$H_x = \frac{K_p \cdot H_p}{K_x},$$

Where H_x --is the need norm for tractors and agricultural machines for the cropping of an oblast (rayon, farm);

K_p --is the output norm with regard to the basic norm-forming factors of the union republic (economic region);

K_x --is the output norm with regard to the basic norm-forming factors of the oblast (rayon, farm), unit of output.

For example, with a yield of 33 quintals per hectare and a run of 600-1000 meters the output norm of the "Kolos" SK-6 grain harvesting combine comes to 11.4 hectares, while with a yield of 23.9 quintals per hectare and the same run it is 13.1 hectares. The planned yield and the run length in the first case are the norm-forming factors of the North Caucasian economic region, and in the second case of Krasnodarskiy Kray.

Using these norms, let us determine the need for SK-6 grain harvesting combines for Krasnodarskiy Kray, picking as our basis the norm for the North Caucasian economic region of 2.5 units per 1000 hectares:

$$H_x = \frac{13.1 \cdot 2.5}{11.4} = 2.87 \text{ шт.}$$

With the same conditions, the output norm of the "Niva" SK-5 grain harvesting

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combine comes to 8 and 10.2 hectares. Hence:

$$H_x = \frac{10,2 \cdot 2,5}{8,0} = 3,2 \text{ шт.}$$

The overall Krasnodarskiy Kray kolkhoz and sovkhoz need norm for grain harvesting combines will come to 6.07 units per 1000 hectares of grain crops excluding corn and rice.

The need norm for these combines, for example, for the "Moskvoretskiy" sovkhoz in Moskovskaya Oblast of the Central Economic Region, with a run length of 300-400 meters and a yield of 36-39 quintals per hectares, is calculated as follows:

$$\begin{array}{l} \text{СК-5 «Нива»} \\ H_x = \frac{9,9 \cdot 8,2}{8,4} = 9,66; \end{array}$$

$$\begin{array}{l} \text{СК-6 «Колос»} \\ H_x = \frac{11,7 \cdot 1,0}{9,6} = 1,22; \end{array}$$

$$H_x = \frac{9,9 \cdot 0,4}{8,4} = 0,47,$$

Where 8.2-- is the Central Economic Region kolkhoz and sovkhoz need norm for "Niva" SK-5 grain harvesting combines, units per 1000 hectares;

9.9--is the output norm of the "Niva" SK-5 grain harvesting combine with a reaper of 4.1 meters, a run length of 400-600 meters, and a plant yield of 23 quintals per hectare (the norm-forming factors correspond to the Central Economic Region), hectares;

8.4--the output norm of the "Niva" SK-5 grain harvesting combine with a reaper of 4.1 meters, a run length of 300-400 meters, a yield of 30 quintals per hectare, and a grain mass to straw mass ratio of 1:1.5 (the norm-forming factors of the "Moskvoretskiy" sovkhoz), hectares;

11.7--the output norm of the "Kolos" SK-6 combine with a reaper of five meters for the conditions of the Central Economic Region, hectares;

9.6--the output norm of the "Kolos" SK-6 combine with a reaper of five meters for the conditions of the "Moskvoretskiy" sovkhoz;

1.0-0.4--the Central Economic Region kolkhoz and sovkhoz need norm for the "Kolos" SK-6 and the "Niva" SK-5 grain harvesting combines, units per 1000 hectares.

The overall need norm for grain harvesting combines of the "Moskvoretskiy" sovkhoz will come to 11.35 units per 1000 hectares of grain crops.

By making use of the union and union-republic norms for the 11th Five-Year Plan

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which were approved by the USSR Ministry of Agriculture in agreement with Gosplan USSR, the need norms of farms for agricultural equipment are calculated in a similar manner.

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